miniDSP 4x10 Hd

USER MANUAL

Revision	Description	Date
V1.0	Initial revision	28-06-2012
V1.1	Updated section on volume control	03-08-2012

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1 Product Introduction

miniDSP 4x10 is a Digital Audio Signal Processor (DSP) capable of performing a wide range of applications, from filtering, equalization to time alignment. Typically located between an audio source (CD player/Receiver/Preamp/PC .. etc) and the amplifier, a miniDSP will provide unparalleled tuning flexibility to improve your audio system's performance. Using a PC/Mac machine and a USB connection, you will be able to control your platform from the "plug-in": an intuitive software application allowing real time modification to your configuration.

Besides its audio specs, a great part of our product concept lies in its simplicity of use. The sequence of steps required to control a miniDSP can be summarized as follow:

- Connect the board to your PC/Mac machine using a USB cable
- Launch the plug-in to configure settings as required.
- Click "Connect & Synchronize" your PC to the board
- Once synchronized, any change is real time and does not require any "Synchronization". All settings are also automatically saved to both the DSP and the Flash for long term memory.
- Once happy with your configuration, you can disconnect the board from your computer since from this point on, the audio configuration will run as last modified in on-line mode and recalled following every reboot.
- Enjoy!

Minimum System Requirements for software installation

MiniDSP software requires in a PC/MAC environment with the following minimum requirements:

PC Environment

- PC with 1GHz or higher processor clock speed recommended / Intel® Pentium®/Celeron® family, or AMD K6®/AMD Athlon®/AMD Duron® family, or compatible processor recommended.
- 512 megabytes (MB) of RAM or higher recommended
- USB 2.0 port
- Keyboard and mouse or compatible pointing device
- Microsoft• ® Windows® Vista® SP1/ XP pro SP2/Win7
- Microsoft• ® .NET framework v3.5
- Adobe AIR environment (latest version)
- Adobe Flash player (latest version)

MAC Environment

- Intel based MAC with 1GHz or higher processor clock speed recommended
- 512 megabytes (MB) of RAM or higher recommended
- USB 2.0 port
- Keyboard and mouse or compatible pointing device
- Mac OSX 10.4 or higher
- Adobe AIR environment (latest version)
- Adobe Flash player (latest version)

Package content

Your miniDSP package includes:

- 1 x miniDSP 4x10 Hd
- 1 x USB cable 1m long
- 1 x 12VDC universal power supply with IEC type plug
- 1 x Step by Step startup guide

DISCLAIMER / WARNING

An incorrect miniDSP configuration could easily damage your audio system. MiniDSP can not be responsible for any damage that may result from the improper use of this product. As with any other product, we do recommend that you carefully read the manual and other technical notes to insure you fully understand how to operate the board.

As a general guideline, you should first configure your miniDSP board **before** connecting anything to the outputs of the MiniDSP (loudspeakers/other output sources). Doing so will insure that you have the software correctly configured and won't cause any damage to your system. Once again, miniDSP can not be responsible of any damages the board make cause to your system.

Finally, MiniDSP is a very flexible board and 99% of typical questions we receive at the tech support department are already answered in this user manual. So please take the time to carefully read this user manual. Thanks for your understanding!

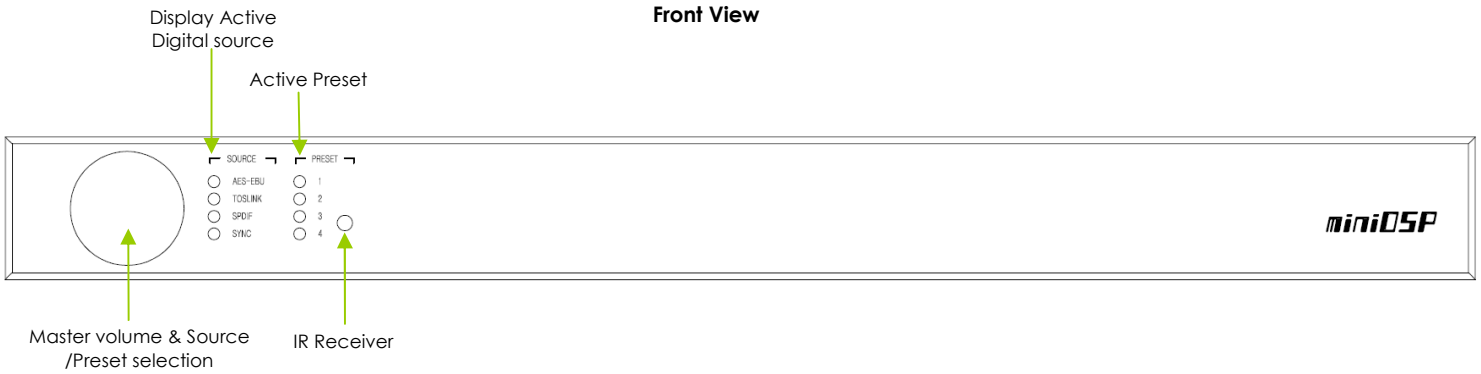
WARRANTY TERMS

miniDSP Ltd warrants all our products to be free of from defects in materials and workmanship for a period of one year from the invoice date. Our warranty terms do not cover failure of the product due to an external trigger, misuse, servicing or usage outside of the recommended use. With this said, make sure to carefully read the user manual when customizing the board. Any board damage investigated as failure to follow proper installation may void the warranty. So if in doubt, **please make sure to contact us first**.

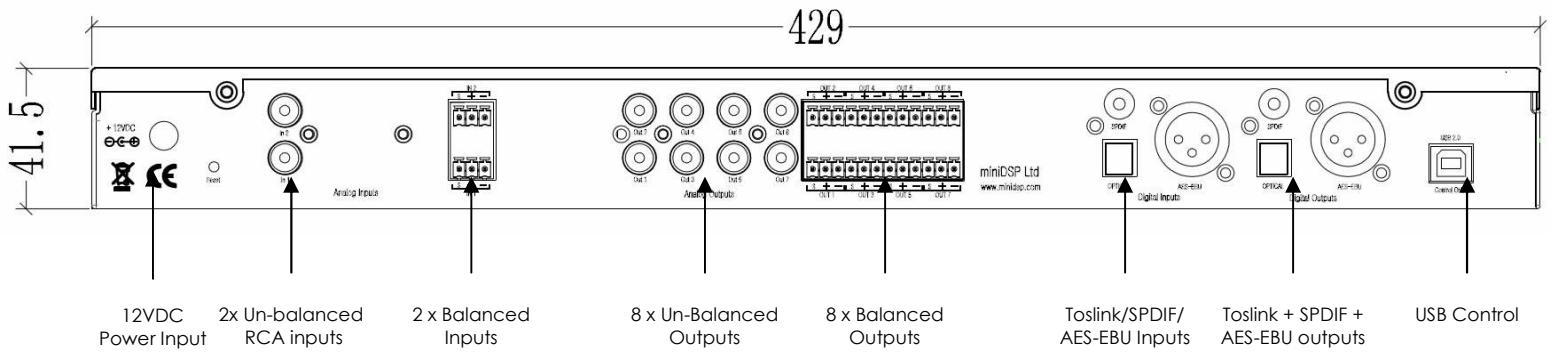
2 System Connectivity

2.1 *Board connectivity*

Front View

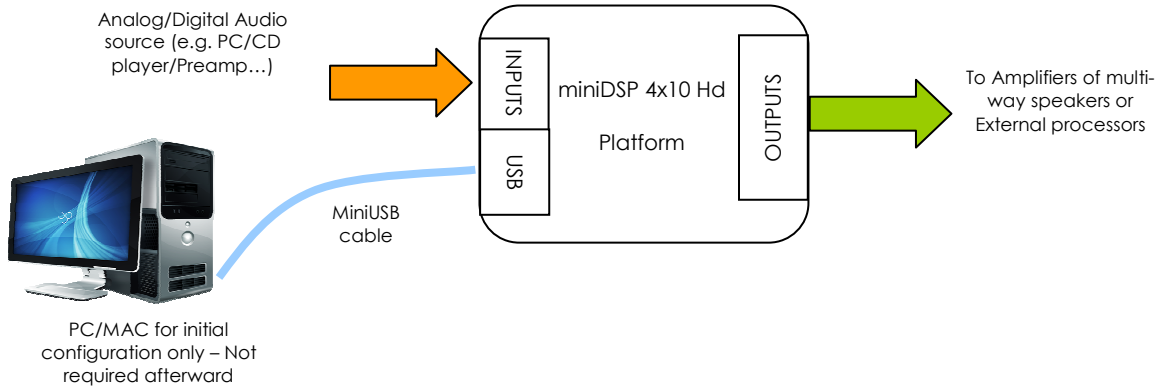


Rear View



2.2 *Typical setup*

The following diagram is a typical connectivity diagram for a basic setup with analog inputs, analog outputs. To prevent any damage, make sure the board is turned OFF before doing any connection modifications.



2.2.1 DC Power connectivity

miniDSP 4x10 Hd is provided with a universal 12V DC power supply with IEC power connector. If the IEC cable provided isn't the same as your country's plug, you can easily source/re-use such cable from computer supplies.

Note that we recommend you to plug the Power Supply to the miniDSP enclosure before connecting it to the AC power.

2.2.2 Audio connectivity

miniDSP can accept both balanced and un-balanced audio inputs/outputs. See the below instructions for audio connectivity on your miniDSP Balanced kit. If a different input/output level is required in order to achieve best gain structure, the enclosure can be opened in order to configure the internal jumpers correctly.

Signal	Max input/Max output
Maximum Input signal @ 0dBFS	RCA connector: 2Vrms (+8 dBu) or 0.9Vrms depending on input jumper position Phoenix Terminal block: 4Vrms (+14 dBu) with an unbalanced signal, 8Vrms with a balanced signal (20dBu)
Maximum Output signal @ 0dBFS	RCA connector: 2Vrms or 0.9Vrms depending on output DIP switch position Phoenix Terminal block: 4Vrms (+14 dBu) with an unbalanced signal, 8Vrms balanced with a signal (20dBu)

Balanced connection (In/Out): Follow connectivity as shown on underside of the board.

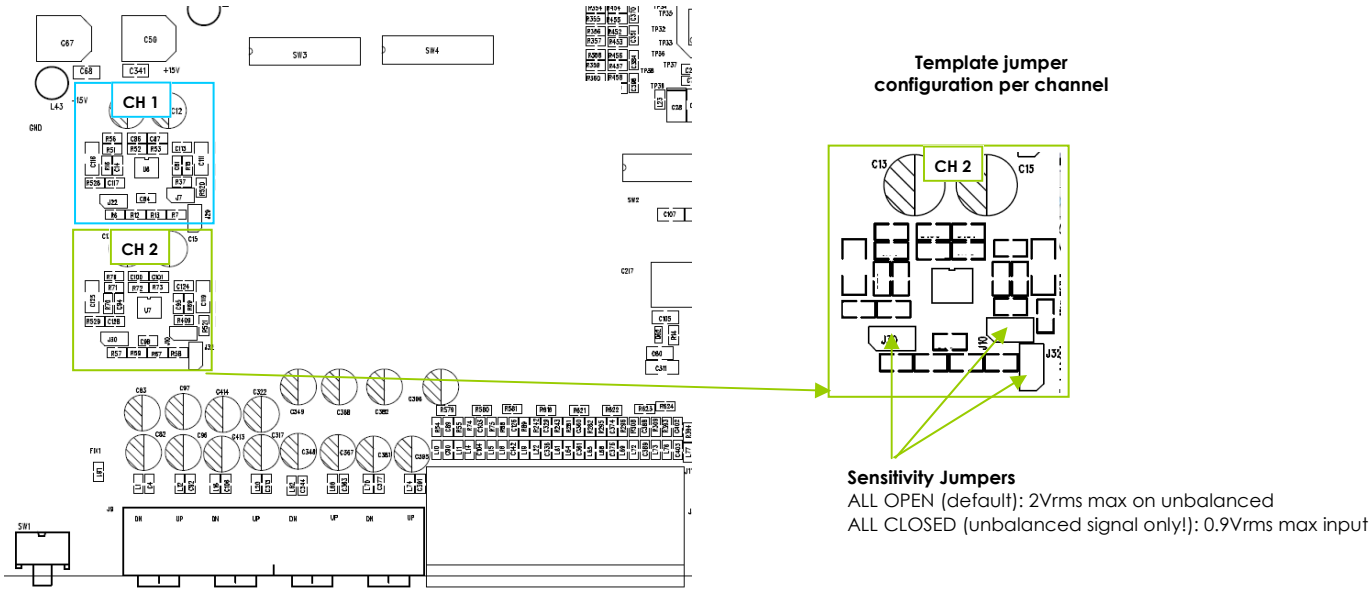
- S = > Cable Shield
- + = > Positive cable
- - = > Return cable

Sensitivity Jumpers for unbalanced inputs

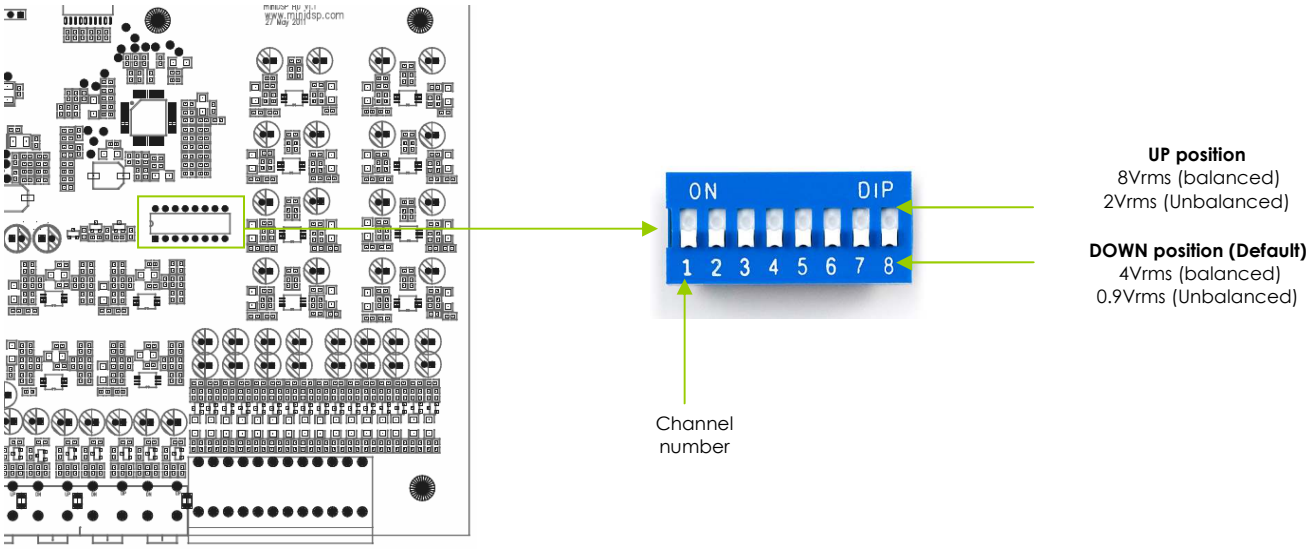
A set of jumpers is available to modify the input sensitivity (i.e. max input) from 2Vrms to 0.9Vrms for **<u>unbalanced inputs only</u>**. Sensitivity is the maximum signal before an input saturates so if your signal is too small (e.g. MP3 player), you can optimize your "gain structure" by modifying the input jumpers to 0.9Vrms for a "more sensitive" input.

Note that this jumper configuration should **<u>not</u>** be used when a balanced signal is used. Please make sure to carefully configure your jumper accordingly. By default, note that all boards are configured without jumpers (i.e. 2Vrms setting) so both unbalanced and balanced can be used.

Board Layout arrangement for input jumper configuration



Output gain control:
A blue DIP switch control on the output section allows user to control the output gain both the unbalanced and balanced outputs on a "per channel" basis.

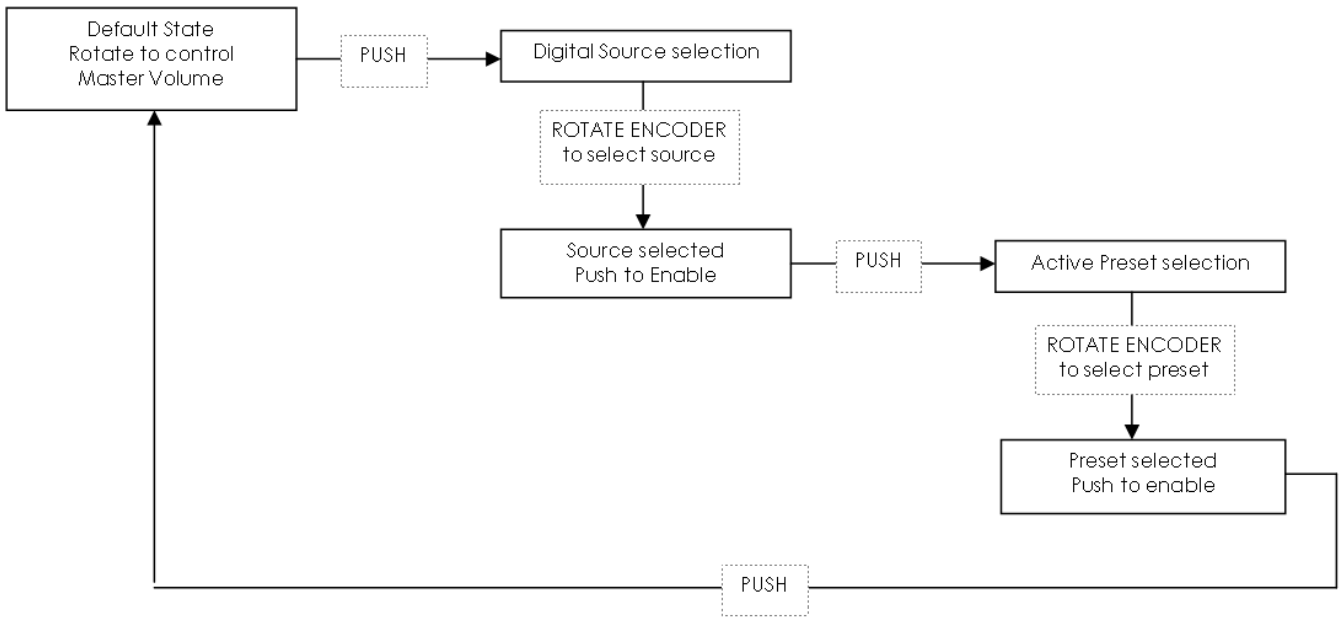


2.3 Front panel control

The miniDSP 4x10 has a rotary front panel for control of 3 elements of the product without requiring any PC connection:

- Master volume control
- Digital source selection
- Active preset (1 out of the 4 preset).

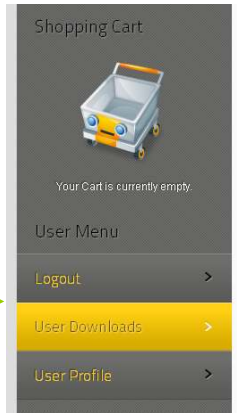
The control is achieved with the rotary encoder with the simple process of Pushing & Rotating. The below flow diagram describes in details the basic operation of this front panel.



3 Software Setup

miniDSP platforms are controlled and configured over a USB connection. Our software, so called **plug-in**, must be purchased from our online webstore separately. The following section will highlight the steps required to configure the miniDSP plug-in.

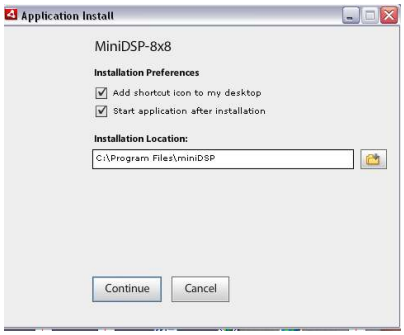
In order to familiarize yourself with the software first, do not connect any amplifiers to your miniDSP outputs until you understand each object.
Get to know the software first, then start playing audio…



1. The first step consists in downloading the following required frameworks:
   - Microsoft• ® .NET framework v3.5 or up (PC only)
   - Latest version of Adobe AIR environment (Mac/Win)
   - Latest version of Adobe Flash player (Mac/Win)

2. Next, go to the User Downloads section of the miniDSP website. The purchased plug-in will be available for download once logged in with the credentials for your account.

3. Double click on the .air file to install the plug-in. The following dialog box will pop up.



Once the configuration finalized, the plug-in will automatically boot up.

4. You can now connect the miniDSP board to one of the USB 2.0 port of your PC. The device will be recognized as a HID driver and does not require any driver installation.

5. The next step is to gain control of the board by synchronizing the PC configuration to the board. Please read carefully the following section to understand how this process works.

By default, all plug-ins start in offline mode, meaning changes made on the user interface do not affect your configuration. It is designed in such a way that you can visually confirm your configuration before loading it to the MiniDSP kit.
You should also know that plug-ins can only synchronize from PC to board and are not able to "retrieve" a configuration from the kit. In other words, make sure your favorite configuration is saved on your PC if you ever decide to change the configuration.

6. Once the configuration checked, the next step is to "Connect & Synchronize" by clicking on the Green button on the top right. Note that this button is ONLY active in an unconnected mode. Once connected, it will disappear since no more synchronization will be required from there on.

Connect & Synchronize

Providing your board is connected to the PC with a USB cable, the following important dialog box pops up with 4 options:

A miniDSP kit with Serial#900026 was detected. Please choose from one of the following options:
Synchronize
Restore to Default
Help
Cancel

a) Synchronize: With this option, the current plug-in configuration will be loaded/flashed to the MiniDSP and your plug-in turned to "On-line" mode. Warning that it will overwrite whatever configuration was previously loaded on the board. If you'd like to load a different configuration, click cancel and go to the settings tab to load one of your previously saved configurations.
If you previously installed a different firmware version on your kit, this button will display: Synchronize & Upgrade. Meaning, the MiniDSP kit firmware will be upgraded to the current plug-in firmware along with the current settings you have.

b) ***Restore to Default:*** With this option, the software application resets all settings back to factory default and reload the firmware. Warning that all current settings will be lost and there are no ways to be able to recover them.

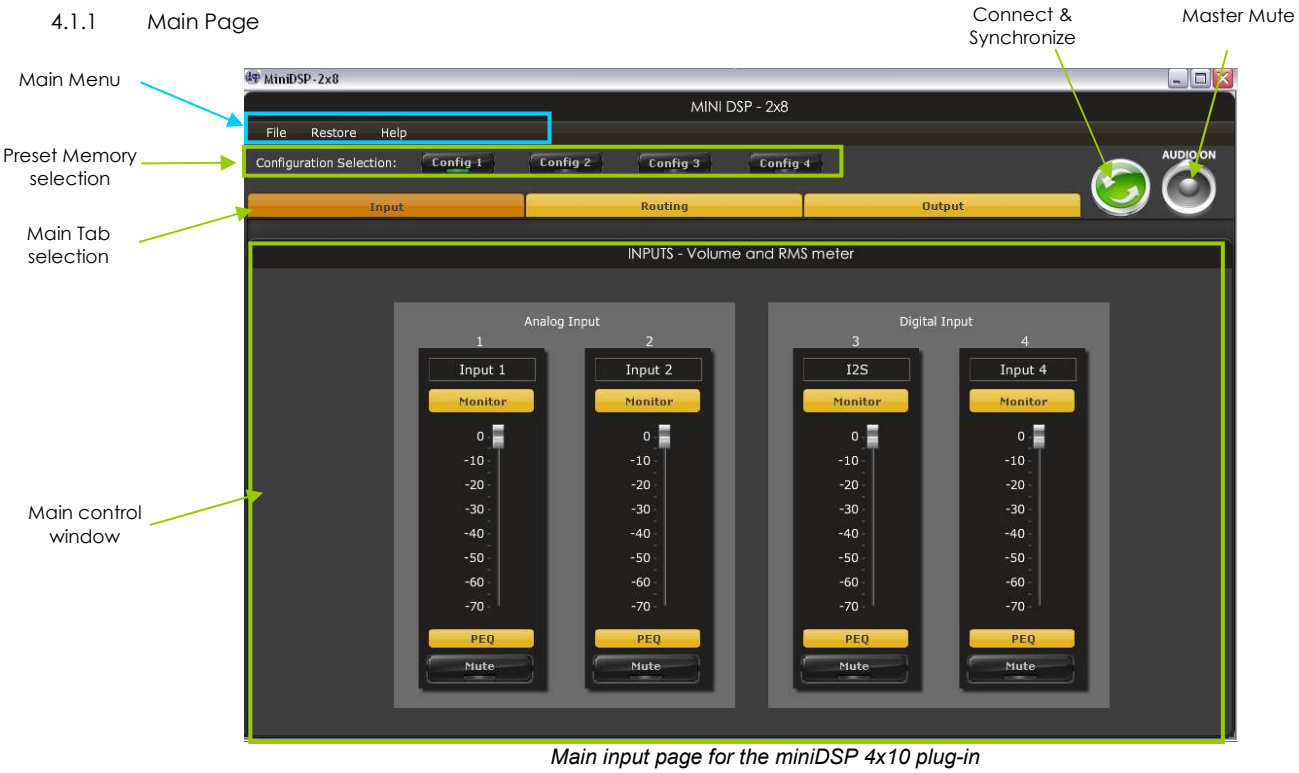
In either synchronization steps, the following dialog box will pop-up. It's very important that you do not un-plug the board in the middle of a firmware upgrades or you may corrupt the configuration.

Once the board fully synchronized, a "Successful connection to the board" message pops up. From this point on, all changes to the configuration will be real time and live, therefore giving you the chance to hear the effect of your equalization, filtering, tuning…

Let's move on to the architecture of the software to understand how to setup your system.

4 Plug-in Architecture

4.1.1 Main Page



Main input page for the miniDSP 4x10 plug-in

The main control page can be summarized in few core sections.

- File Access to Load/Save configuration
- Restore: Access to restore the whole system or only the current selected configuration (preset)
- Help: Link to the help file
- Main control tab: Allows selection between input, matrix and output control windows
- Main control window: Contains controls for the selected tab
- Synchronize button: Allows you to go online and gain control of your system
- Master Mute: Mute all inputs & outputs signal

4.1.2 Preset Memory selection

The miniDSP 4x10 Hd allows the user to create up to 4 preset memories for a quick reconfiguration of the processor. Under each configuration, all settings of the platform are saved.
Placed at the top of the user interface, the use of configurations couldn't be easier. Simply toggle between configurations by clicking on the config button. The currently selected configuration

WARNING: By toggling configurations, you may go from a working configuration (i.e. correct volume/setup/Eq) to an unknown (or improperly configured) configuration. We therefore recommend that you perform a quick configuration offline (without being connected/synchronized to the processor) to prevent any damage to your equipment.

4.1.3 Input Tab

The first step in configuring your MiniDSP consists in making sure audio is being fed to the input correctly. To do so, click on the button labeled "inputs". The RMS meter will quickly indicate the average value of the input signal in dBFS (i.e. relative to the full scale of the ADC or 24bit I2S signal). Individual faders control the digital gain at the input and per channel mute status.

This meter displays dB full scale (dBFS) values and will saturate at 0dBFS (full scale of the ADC). Do make sure to keep the signal below 0dBFS (red color) and with enough headroom (say 10dB) to prevent saturation during the typical audio peaks of a music source.

4.2 Matrix Tab

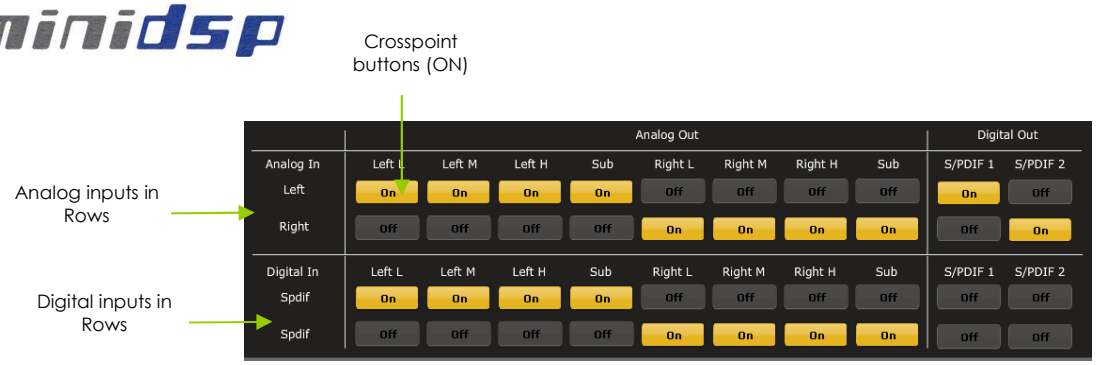
The matrix DSP object is the DSP object linking inputs to outputs. While very typical on commercial DSP products, it may be new for some of you. The following section will summarize the basics of configuration.

Matrix switchers work as a "matrix" where:

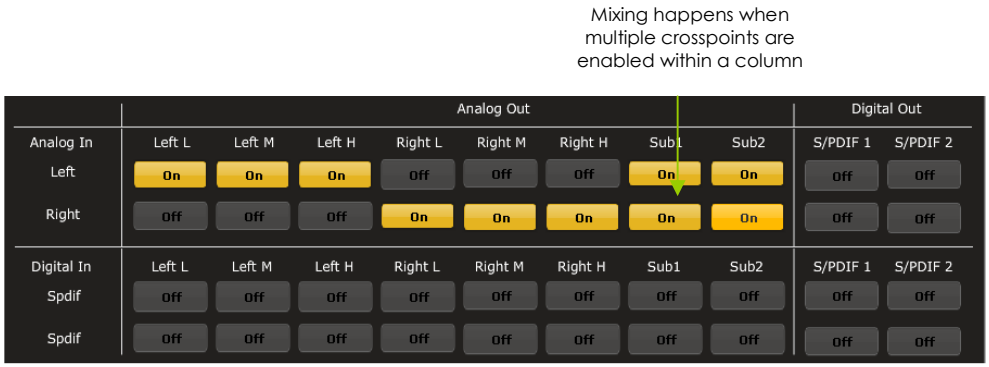
- Rows are inputs
- Columns are outputs
- And the status(ON/OFF) of the buttons at the crosspoint of rows (inputs) & columns (outputs) will define the routing and mixing of the audio to one of 8 outputs. .

The following configuration shows how the matrix should be configured for a 4way configuration with:

- Left analog audio input being routed to analog outputs 1-4
- Right analog audio input being routed to analog outputs 5-8



Note how labels of input channels and output channels followed on the Matrix mixer to simplify your routing.
Let's illustrate the concept of configuration of this block using a 3way configuration + 2 subs where both Left & Right signals are being mixed (combined).



4.3 Output Tab

4.3.1 Custom Label

The custom label feature allows you to input a user defined label for each output channels: A handy feature to remember the output configuration of your system.

4.3.2 Monitor

Allows you to monitor the input meter of that specific channel on a RMS meter. Note that the information is shown in dBFS

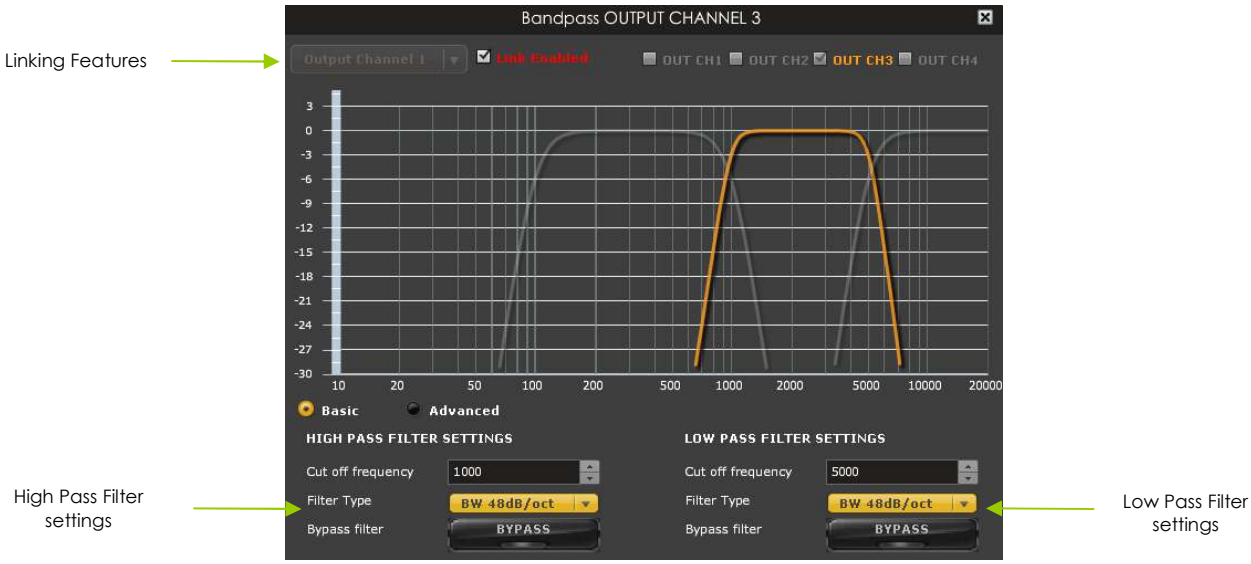
4.3.3 Output volume

A fader control for +12 to -70dB digital gain control. Similar to the input volume control.

4.3.4 Crossover

Controls for the Low& High pass filters are available when clicking on the Xover (crossover) button:

The log scale graph gives you the equivalent response of the applied filter. By pointing the mouse anywhere on the plotted curve, the dB attenuation and respective frequency are displayed.



- Cut off frequency: Select the -3dB frequency by either entering the value or using the up & down arrows of the numeric box.
- Filter types:
  - Linkwitz Riley (LR): Available in 12, 24, 48dB/oct
  - Butterworth (BW): Available in 6, 12, 18, 24, 30, 36, 42, 48dB/oct
  - Bessel: Available in 12dB/oct

  Each filter has different phase and amplitude characteristics. We recommend you to look online for more information about the specifics of each filter.
- Bypass button allows you to Enable/Disable the filter. Make sure to bypass the filter if you do not need the filter enabled.
- Linking feature allows you to link real time the settings of two crossover windows: a handy feature for stereo environments requiring synchronized changes to both left and right channels.

Step 1: Select the channel you would like to link to from the drop down menu. The linking feature will link these two channels together.

Step 2: Click on the "Link" tick box to enable the linking.

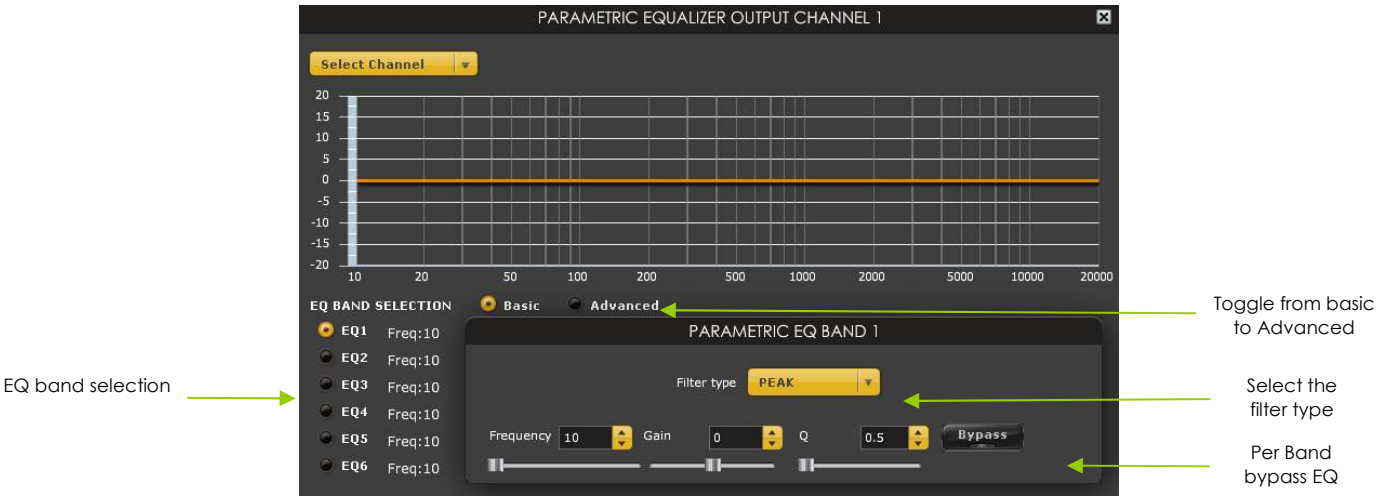
Note that the environment will warn you that all current PEQ settings of the current channel will be copied over to the linked channel.

Warning
Linking of channels will copy all current filter settings to the selected mirroring channel. Would you like to go ahead?
Yes
Cancel

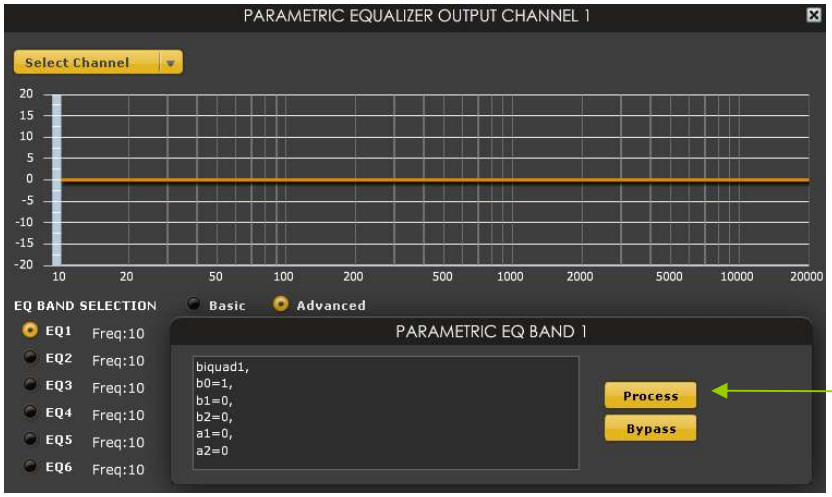
At anytime during the operation, you can decide to "unlink" the channels by simply clicking on the "link" tick box.

4.3.5 Parametric Equalizer

- EQ band selection: Select one of the 6 x Parametric Equalizers
- Filter type: Select between Peak, Low Shelf, High Shelf
- Bypass: Disables the equalization but doesn't reset the settings. A handy tool to check the influence of equalization on your system without resetting to zero. Note that the bypass button is per-band Bypass (not overall).
- Linking feature: Similar to the crossover dialog box, you can link up two EQ settings together.
- Basic/Advanced radio button: Toggles from basic mode (i.e. input frequency) to advanced custom biquad input.



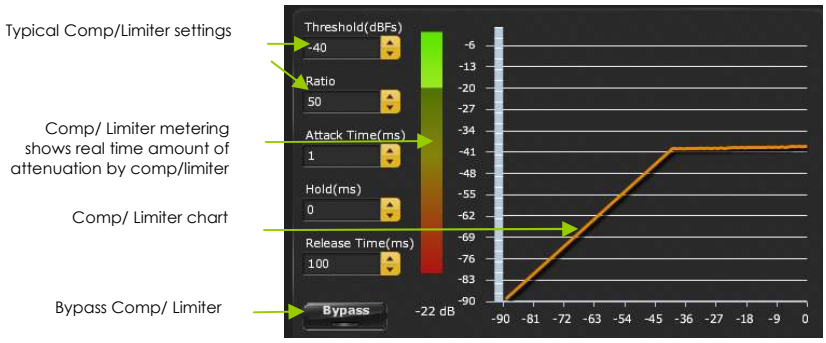
Basic mode



Advanced mode for custom biquad programming

The Advanced mode can be used for your custom filters of external software such as Room EQ Wizard (REW). For more information about the auto-tuning feature of the miniDSP, please check miniDSP's website for the following application note.

4.3.6 Compressor /Limiter



A compressor/Limiter allows dynamic range compression of the signal to prevent damage of your speakers. Extensive information is available online on the use of compressor/limiter. Please take the time to familiarize yourself with such processing block before using it.

4.3.7 Master volume control

The master volume allows control of all 10 outputs channels (Analog + digital) of the miniDSP unit. It is enabled from the front panel unit (VOL-FP panel) and requires a small configuration from the software to be enabled. Please make sure to select the "IR mode" to make sure your unit is correctly configured.

4.4 Load/Save/Restore a configuration

4.4.1 Load configuration:

Use this feature to load a previously saved configuration. The file must be as .xml format and previously saved from this plug-in. For complexity reasons, inter-plug-in compatibility is not available.

4.4.2 Save Current Configuration

Use this feature to save your audio settings configuration. The following dialog box allows you to save the file anywhere on your PC as a .xml format. Only the current selected preset memory is saved.

4.4.3 Restore Factory default

Use this feature to restore the board back to factory default. Warning that all configurations will be restored back to default from this action.

4.4.4 Restore Factory default

Use this feature to restore the board back to factory default. Warning that settings of all four configurations will be blanked back to default.

4.5 Firmware upgrade

In order to enable some new features, the miniDSP may require to be flashed with a new firmware. All the required tools and firmware files are already included in the in the installation folder of the plug-in. So the first step to make sure you have everything you need is to install the new plug-in by logging to the UserDownload section. Note that firmware upgrade tools is Windows only at this point of time. A mac tool is in the works.

A warning may be shown during synchronization if you have the incorrect firmware loaded on your platform.
Once the new plug-in installed, please browse to \\Program Files\MiniDSP\MiniDSP-8x8\firmware_tools\Windows. Three files can be found there:
- Upgrade steps
- Upgrade Tool excecutable
- Firmware file

The firmware upgrade summarizes to few simple steps:

1. Unplug the DC power
2. Press and hold the reset button while pluging the power to the board
3. Release the reset button
4. Connect the USB to the
5. Open Upgrade Tool
6. Click Open Hex File
7. Choose the lastest hex file
8. Click Program/Verify
9. Reset Device

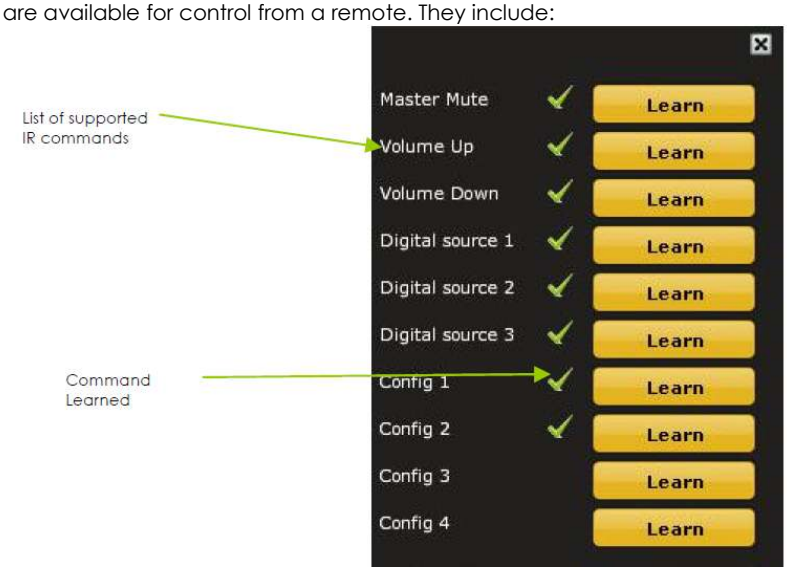
That's all. You're ready to move on to using a new firmware.

4.6 IR remote learning feature

This feature is enabled on platforms enabled with the correct firmware and latest plug-in. Please check the plug-in information to make sure it currently supports the feature.

In an effort to keep the platform compatible with the most common IR standards and not ask users to add another remote to your pile, we implemented an IR learning feature. This feature allows you to use any remote compatible with the NEC/Philips RC6 and Sony IR standards. Learning an IR commands goes as follow:

1) Connect & synchronize the board to the newly downloaded plug-in
2) Under the new "IR Remote Plug-in", click on the "IR Learning menu" to reach the following dialog box.
3) Ten commands are available for control from a remote. They include:



- Master mute
- Volume Up: 1dB increments with ramping down when holding button
- Volume Down: 1dB decrements with ramping down when holding button
- Digital Source 1/2/3 used for a new I/O card (OUT OF SCOPE of this beta testing)
- Config 1/2/3/4: Used to select one of the config built under the software. Make sure you've previously pre-configured these first!

To program a command, 2 simple steps:

- While connected and synchronized: Press the "LEARN button"
- Point the remote to the IR receiver and press the button to learn the command. A dialog box will confirm a successful learning and a green arrow appears once the command learned.

In case the platform fails to learn the remote command, you most likely do not have a Philips RC6/Sony/Nect compatible remote. Please try another remote.

Feature such as Config 1-4 selection will **only** work when the unit is **not** connected/synchronized to the plug-in. Command for Digital source selection is for future only and does not apply to any miniDIGI setup.

5 Troubleshooting

The following symptoms were found to be the most likely cause of issues.

Item#	Symptoms	Troubleshooting recommendation	If not solved go to item
1	No audio on outputs	- Make sure that audio signal is shown on the RMS input meters. - Double check that input & output mute buttons are not enabled - Confirm that master mute is not enabled - Confirm that you are synchronized and live	3
2	No audio on RMS input meters	- Check your connectivity - Double check the strength of your input signal. - Confirm that master mute is disabled	10
3	Audio on input RMS meters but no audio on outputs	- Make sure the matrix mixer is set to send audio to the output channels in a mixer plug-in - Check the output mute status for each channel	10
4	Cannot reload configuration	- Confirm the file format of your file (.xml) - Confirm the version of the file	10
5	Cannot connect to the board	- Reset the board by powercycling the unit - Make sure the unit is seen in the device manager as a HID device	10
6	Cannot install software	- Confirm that you installed the required frameworks (Adobe Air/ Microsoft .net / SP2 XP)	10
7	Software running in background but not showing	- Adobe Air environment most likely requiring a version update. Connect your PC to the Internet to automatically get an update.	10
10	Problem unsolved by above suggestions	- Have a look at our forums to see if someone else already had this issue. - Send us an email (info@minidsp.com) with a clear explanation of the symptoms and descriptions of the troubleshooting steps you already performed	n/a